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Impact factors on graduates' income and employability: an analysis at a federal higher education institution

Factores de impacto en los ingresos y la empleabilidad de los graduados: un análisis en una institución federal de educación superior

Fatores de impacto da renda e da empregabilidade de egressos: uma análise em uma instituição federal de ensino superior

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Abstract

Purpose: This study aims to analyze the influence of demographic characteristics and course evaluation on the income and employability of higher education graduates.

Methodology: The research was conducted with 410 graduates of the Federal University of Cariri (UFCA) who completed their courses between 2013 and 2021. Multiple regression analysis and logistic regression techniques were used to analyze the data.

Results: The results of the study reveal important data about alumni: a higher level of education was related to lower income, alumni who choose to pursue careers outside their areas of training receive higher salaries, and the perceived impact of the course is directly related to the income of graduates.

Contributions of the Study: The results provide an opportunity to understand the factors that influence graduate employability and potential improvements, laying a solid foundation for further discussions and potential educational and labor market measures in the region.

Keywords: Graduates. Income. Employability. Higher Education.

Resumen

Objetivo: Este estudio tiene como objetivo analizar la influencia de las características demográficas y la evaluación de los cursos sobre los ingresos y la empleabilidad de los graduados de educación superior.

Metodología: La investigación se realizó con 410 egresados de la Universidad Federal del Cariri (UFCA) que concluyeron sus cursos entre 2013 y 2021. Para analizar los datos se utilizaron técnicas de análisis de regresión múltiple y regresión logística.

Resultados: Los resultados del estudio revelan datos importantes sobre los egresados: un mayor nivel de educación se relacionó con menores ingresos, los egresados que eligen seguir carreras fuera de sus especialidades reciben salarios más altos y el impacto percibido del curso está directamente relacionado con los ingresos de los egresados.

Contribuciones del Estudio: Los resultados proporcionar una oportunidad para comprender los factores que influyen en la empleabilidad de los graduados y posibles mejoras, sentando una base sólida para futuros debates y posibles medidas educativas y del mercado laboral en la región.

Palabras clave: Egresados. Ingreso. Empleabilidad. Educación superior.

Resumo

Objetivo: Este estudo visa analisar a influência das características demográficas e de avaliação de curso na renda e empregabilidade dos egressos do ensino superior.

Metodologia: A pesquisa foi realizada com 410 egressos da Universidade Federal do Cariri (UFCA) que concluíram seus cursos no período de 2013 a 2021. Para analisar os dados, utilizou-se as técnicas de análise de regressão múltipla e de regressão logística.

Resultados: Os resultados do estudo revelam dados importantes sobre os egressos: um nível mais elevado de educação foi relacionado com uma renda inferior, os egressos que escolhem seguir carreiras fora de suas áreas de formação recebem salários mais altos e o impacto percebido do curso está diretamente relacionado à renda dos egressos.

Contribuições do Estudo: Os resultados oferecem uma oportunidade de compreender os fatores que influenciam a empregabilidade dos egressos e as potenciais melhorias, estabelecendo uma fundação sólida para debates posteriores e potenciais medidas educacionais e de mercado de trabalho na região.

Palavras-Chave: Egressos. Renda. Empregabilidade. Ensino Superior.

1 Introduction

The labor market is a dynamic and complex space that involves multiple agents and factors that shape opportunities and challenges for workers. Rapid technological change, digitalization, and globalization are reshaping today's workplace structure (Di Battista et al., 2023). Technologies that did not exist just a decade ago are increasingly transforming the nature of jobs, work practices, and current skill requirements (Pennington & Stanford, 2019; World Bank, 2019).

Professional life is increasingly marked by low job security and different types of short-term contracts. Changes in the labor market have generated demands for new and diverse qualifications, including a greater need for generic skills, resulting in a more intensive focus on the impact of higher education, graduates' employability, and the relationship between higher education and the labor market (Nilsson, 2017).

The quality of the education received, the relevance of courses to local market needs, and access to internship and networking opportunities are also decisive factors in increasing employability levels (Krajňáková et al., 2020). Therefore, understanding and adapting to demographic nuances is essential for promoting better alignment between job supply and demand, as well as fostering economic and social development within communities.

The demographic characteristics of a region can significantly influence the professional trajectory of higher education graduates. Factors such as gender, population growth, age distribution, urbanization level, and the sectoral structure of the local economy directly affect employment opportunities and income after graduation. In medium-sized cities and regional hubs, the presence of a young working-age population and the concentration of

higher education institutions tend to intensify competition for job vacancies, shaping both entry and mobility within the labor market (Gomes et al., 2021).

The relationship between demographic characteristics and employability levels among higher education graduates is widely discussed in international research, given its direct impact on the economic and social development of communities worldwide (González-Romá et al., 2018; Krajňáková et al., 2020). According to Nilsson (2017), assessing the qualitative aspects of higher education and individual employability is a complex task, as it involves procedures that require considerable resources, such as competency surveys. For this reason, indicators such as educational success, employment, unemployment, and earnings are used as proxies for employability at more aggregated levels.

According to Fonseca and Ferreira (2020), each individual brings a unique set of acquired skills, or human capital, to the labor market, with most of this capital being obtained through schooling and training programs. Regarding the tracking of higher education graduates, significant differences exist between Brazil and European countries. While, in Brazil, most data originate from graduate tracking portals of Higher Education Institutions (HEIs), in Europe such data are directly linked to each country's education system (Oliveira, 2021).

According to the 2023 Higher Education Map in Brazil (Semesp, 2023), the total number of higher education graduates in 2021 was 842,184, of whom 76.5% completed on-site programs. The same report indicates that Brazil continues to face high dropout rates. The overall completion rate is only 26.3%, with higher completion levels in face-to-face and distance-learning programs in the private sector. In the state of Ceará alone, 39,200 students completed their undergraduate degrees in 2021, with 35.4% graduating from distance-learning programs. The total completion rate was 18.8%, with the largest number of graduates in Law, Nursing, Psychology, and Business Administration (Semesp, 2023).

In 2021, Ceará achieved the 12th highest Municipal Human Development Index (IDH-M) among Brazilian states (0.734), ranking first in the Northeast. Among Ceará's 184 municipalities, Juazeiro do Norte ranked 30th in the Municipal Development Index (IDM) in 2017, according to IPECE (2019). Currently, the city of Juazeiro do Norte has eight HEIs, including two federal, one state, and five private institutions (Portal e-MEC, 2025).

Internationally, the study by Mainga et al. (2022) analyzes the perceptions of fourth-semester Business Administration students regarding their employability skills upon graduation. González-Romá et al. (2018) investigated whether indicators such as career identity, personal adaptability, and human and social capital are related to the employment situation of university graduates. Jaques (2022) examined the factors that enable Economics and Business graduates in Catalonia to achieve success in the labor market.

Studies conducted in Brazil have shown that employability and income among higher education graduates are strongly linked to field of study, program quality, and regional labor market conditions. Research indicates that although holding a degree increases the likelihood of professional integration, many graduates face gaps between the skills acquired at university and those demanded by companies, which can affect both job placement and salary levels (Braga et al., 2022; Mondini et al., 2020). Furthermore, the literature highlights that the heterogeneity of the Brazilian labor market, marked by regional inequalities, amplifies differences in the career trajectories of graduates, demonstrating that higher education, while necessary, does not guarantee stability or high income on its own (Costa, 2018).

Considering the studies mentioned above, which discuss characteristics and variables involving higher education graduates and employability—factors that may affect employability levels across the country and, more specifically, in the Cariri region of Ceará—the present

research poses the following guiding question: **What is the influence of demographic characteristics and course evaluation on the income and likelihood of graduates working in their field of study?** Accordingly, the general objective is to analyze the influence of demographic characteristics and course evaluation on the income and employability of higher education graduates. To achieve this, the study was conducted with graduates from the Federal University of Cariri, located in the interior of the state of Ceará.

The results of this study may be compared with existing international literature, helping to address the shortage of national research and contributing to a better understanding of the relationship between higher education graduates and demographic characteristics in Brazil. The findings can also support the development of public policies that encourage employers to recruit graduates whose skills align with labor market demands, as well as the adaptation of course methodologies in programs with low employability levels.

2 Literature Review

The income and employability of higher education graduates are influenced by multiple factors that extend beyond academic training. Elements such as human capital, social networks, internship and extension experiences, as well as the alignment between acquired skills and the demands of the productive sector, have been identified as determinants of professional insertion. Studies also highlight that gender, race, and regional inequalities significantly affect job opportunities and salary levels, revealing that university education interacts with broader socioeconomic contexts (Silva et al., 2021; Saraiva et al., 2023). In this sense, understanding employability and income requires consideration of both the quality and relevance of the education provided and the structural conditions of the Brazilian labor market.

2.1 Graduates, Income, and Employability

In Brazil, the ABMES Employability Survey (2023) reports that 75.6% of graduates are employed, and among them, more than 62% work in their field of study. Regarding social characteristics, the study sample shows a predominance of female graduates (44%) compared to 27% male. Concerning race, 32% identified as White, 21% as Brown, and 41% chose not to answer. The study also indicates that 73% graduated from bachelor's programs, 75% completed face-to-face degrees, and 29% are graduates from health-related programs. In addition, the survey shows that in the Northeast region, 84% are working in their area of specialization.

Rose (2018) highlights the importance of understanding professional insertion as a socially constructed process, which requires considering the influence of the strategies adopted by the different actors involved. To better understand who graduates are, Law No. 9.394/96 defines a university graduate as someone who completes a higher education program.

However, beyond earning a diploma, graduates must develop competencies and skills that enable them to perform professionally and participate socially. In this regard, Opinion CNE/CES No. 334/2019, which established Guidance for the National Curriculum Guidelines for Undergraduate Courses, emphasizes that graduates must acquire competencies not only in their area of specialization but also in ethical issues, creativity, and problem-solving. Moreover, certain characteristics are inherent to each graduate—such as gender and place of residence—and may influence their career paths.

Information systems, according to Queiroz and de Paula (2016), are essential for analyzing the relationship between graduates and employability. These systems should allow

for continuous contact between graduates and the higher education institution, as well as collect data and feedback on graduates' performance and satisfaction regarding the program and the institution. This information is fundamental for improving pedagogical projects, teaching and learning processes, and academic management, ultimately aiming to enhance employability in the graduates' respective fields.

The term employability is used to describe a set of achievements that encompasses skills, understanding, and personal attributes that make an individual more likely to obtain and succeed in the occupation of their choice, benefiting themselves, the workforce, the community, and the economy (Wickramasinghe & Pereira, 2010). According to this definition, employability is related to personal competencies that increase the likelihood of integration into the labor market (Jaques, 2022).

Suleman (2017) argues that universities must provide valuable skills and prepare graduates for the labor market. This perspective implies that employability is essentially a matter of individual competencies, and higher education institutions cannot ignore it—they must adapt and respond to labor market demands (Krajňáková et al., 2020).

2.2 Empirical Evidence: Employability, Income, and Graduates

Tracking graduates is an essential practice for Higher Education Institutions (HEIs) to understand the impact of their training on the professional trajectories of former students. This process allows institutions to assess the effectiveness of the programs offered, identify areas for improvement, and consequently enhance the quality of higher education. Several studies have examined this topic, highlighting both the benefits and the challenges faced by HEIs in supporting graduates' insertion into the labor market.

Lemos et al. (2011) and Cunha and Primo (2011) demonstrate that higher education constitutes a strategic resource for individuals, increasing their chances of entering the labor market and improving their income, regardless of their social background. When analyzing the relationship between academic performance and student income in Business Administration programs, Ferreira and Abranches (2018) found no direct correlation between academic performance and income. However, students with higher academic achievement (top quartile) tend to earn higher incomes. Thus, academic performance can be considered an important component in the professional development of students.

Graduates who expand their knowledge and specialization levels tend to increase both their employability and earnings (Sousa et al., 2016). However, during the global COVID-19 pandemic, graduates who were quota students perceived a greater threat to job stability compared to non-quota graduates. Furthermore, obtaining a job or promotion was more difficult for quota graduates, and overall labor market conditions deteriorated more significantly for them than for non-quota graduates (De Carvalho Junior & Xavier, 2022).

Internationally, González-Romá et al. (2018) conducted a study in Spain and found a positive relationship between professional experience and employability. According to the authors, higher education institutions should facilitate opportunities for university students to acquire some form of work experience. They also emphasize that social capital increases the likelihood of graduates being employed and improves job quality. Having a broad social network of professional and informal contacts facilitates employment and career advancement, as such connections provide access to relevant career-related information and help identify job opportunities.

Nilsson (2017) found that in Europe, students from higher-income families experience greater labor market integration. Thus, family income level has a statistically significant positive influence on graduates' integration into the labor market. Tilak and Choudhury (2021) showed that the weak connection between academia and industry remains a major issue in India's education sector, requiring improvement to promote greater graduate employability.

Mainga et al. (2022) conducted a study in the Caribbean and concluded that a combination of traditional teaching, student-centered learning approaches, and innovative and integrative pedagogies is necessary to develop the range of interpersonal competencies graduates need to succeed in the workplace. It is the responsibility of faculty members to determine the appropriate portfolio of learning methods needed to develop a targeted combination of interpersonal skills suitable for each discipline.

Jaques (2022) carried out a study with Economics and Business graduates in Catalonia and found that academic variables are not significant in determining the time it takes for graduates to enter the labor market. However, socioeconomic variables and prior work experience play an important role. Regarding professional success, factors related to academic background, socioeconomic conditions, and the type of employment contract are decisive. In summary, graduate tracking is essential for institutions seeking to understand and improve the effectiveness of their educational programs, with the aim of enhancing graduates' employability and income.

3 Methodological Procedures

3.1 Sample and Data Collection

The initial sample of this study comprises all graduates from the Federal University of Cariri (UFCA) who completed their programs between 2013 and 2021, totaling 2,653 students enrolled in on-campus undergraduate courses. In this regard, the research adopted a probabilistic convenience sampling approach, following Mainga et al. (2022), in which participants were selected based on their accessibility and willingness to respond to the questionnaire, thereby ensuring meaningful representation of UFCA graduates during the specified period.

Data were collected through a structured questionnaire with closed-ended questions, administered via Google Forms between July 1 and December 31, 2021. The form is part of UFCA's Undergraduate Graduate Tracking Survey and was developed by the Office of the Pro-Rector for Undergraduate Studies. The questionnaire contained 22 questions, of which seven addressed socioeconomic characteristics and fifteen were related to graduates' professional activities in the labor market and their evaluation of the institution. A total of 431 responses were obtained, and after database processing (excluding incomplete responses), 410 valid responses remained. Data tabulation and estimation were performed using the R software.

Table 1 presents the distribution of the total number of graduates and respondents by program, allowing for an assessment of the sample's representativeness relative to the studied population and potential variations in participation rates across areas of study.

Table 1*Number of graduates and respondents per course*

Course	Total Graduates	%	Respondents	%
Business Administration	227	8.56%	38	9.27%
Public Administration	96	3.62%	19	4.63%
Agronomy	248	9.35%	60	14.63%
Library Science	153	5.77%	22	5.37%
Biology	20	0.75%	2	0.49%
Product Design	130	4.90%	17	4.15%
Civil Engineering	429	16.17%	72	17.56%
Materials Engineering	140	5.28%	25	6.10%
Philosophy (Bachelor's)	61	2.30%	14	3.41%
Philosophy (Licentiate)	146	5.50%	9	2.20%
Physics	2	0.08%	0	0.00%
History	33	1.24%	6	1.46%
Interdisciplinary Studies in Natural Sciences and Mathematics	146	5.50%	5	1.22%
Journalism	139	5.24%	37	9.02%
Mathematics	9	0.34%	1	0.24%
Medicine	533	20.09%	70	17.07%
Music	123	4.64%	12	2.93%
Chemistry	18	0.68%	1	0.24%
Total	2,653	1	410	1

Source: Research data.

The data on the number of students who answered the questionnaire by degree program reveal different levels of participation. Programs such as Agronomy (60), Civil Engineering (72), and Medicine (70) reported a high number of responses, suggesting greater interest or availability among their graduates to take part in the survey. In contrast, programs like Biology (2), Mathematics (1), and Chemistry (1) showed very low participation, which may reflect either a smaller number of graduates or a lower level of engagement with the study.

Programs with intermediate participation, such as Business Administration (38), Journalism (37), and Library Science (22), present a more balanced representation within the sample. Differences in response rates may be shaped by several factors, including the nature of the questionnaire, graduates' interest in the topic, their perceived relevance of the research, and the total number of graduates in each program.

Understanding these variations is essential for interpreting the results, as they may indicate differing levels of engagement, satisfaction with the training received, and perceptions of the importance of contributing to institutional studies. This information is important for identifying both areas of strength and opportunities for improvement in the programs offered by UFCA.

3.2 Econometric Model

To examine the influence of demographic characteristics and course evaluation on graduates' income, Equation 1 was developed and estimated using multiple regression. This

statistical technique is widely used to explore and model the relationship between a dependent variable and two or more independent variables. Multiple regression is commonly applied in fields such as the social sciences, economics, and health, as it allows for the analysis and prediction of complex phenomena shaped by multiple influencing factors.

$$income_i = \beta_0 + \beta_1 gender_i + \beta_2 age_i + \beta_3 edu_i + \beta_4 prof_i + \beta_5 avac_i + \beta_6 avai_i + \beta_7 avaq_i + \varepsilon_i \quad (1)$$

The dependent variable income represents the graduate's income range. The independent variables related to the graduates are the following: gender, a dummy variable coded as 1 for male graduates and 0 otherwise; age, which refers to the age group; edu, which reflects the graduate's level of education (specialization and MBA, master's degree, doctoral degree); prof, which indicates the graduate's employment status in relation to working in their field of study; avac, the perceived contribution of academic training to entering the labor market; avai, the perceived impact of the degree on the graduate's socioeconomic situation; and avaq, the perceived relationship between the quality of the knowledge acquired during the program and its application in professional practice.

To assess how demographic characteristics and course evaluation factors affect the probability that graduates are working in their field of study, Equation 2 was estimated using a logistic regression (logit), given that the dependent variable is binary.

$$prof_i = \log \left(\frac{P(x)}{1-P(x)} \right) = \beta_0 + \beta_1 gender_i + \beta_2 age_i + \beta_3 income_i + \beta_4 edu_i + \beta_5 avac_i + \beta_6 avai_i + \beta_7 avaq_i + \varepsilon_i \quad (2)$$

Logistic regression, or the logit model, is a statistical technique used to model the relationship between a binary dependent variable and one or more independent variables. The logit model transforms the dependent variable into the logarithm of the odds of success, allowing the relationship between the independent variables and the dependent variable to be modeled linearly. The main advantage of logistic regression is its ability to estimate the probability of an event occurring for different values of the independent variables, thereby providing insights into the likelihood of occurrence.

The results of these analyses make it possible to better understand the factors that influence the income and employability of graduates, identifying areas of success and opportunities for improvement in the programs offered by UFCA. Such insights are essential for guiding educational policies and labor-market insertion strategies, with the aim of increasing the effectiveness of academic programs and the professional success of graduates.

4 Results Analysis

4.1 Sociodemographic Characteristics of Respondents or Exploratory Analysis

This section presents the sociodemographic characteristics of the survey respondents. The data reveal a distribution of self-declared racial or ethnic identity, with most responses falling into the categories "White" and "Brown," with 179 and 166 responses, respectively. The "Black" category includes 48 responses, while "Yellow" accounts for 12. In addition, five individuals chose not to disclose their race or ethnicity. This distribution reflects the racial or ethnic diversity within the sample, with a larger proportion of individuals identifying as White

and Brown. Regarding age, most respondents fall within the ranges of 23 to 27 years and 28 to 33 years, both with 176 respondents.

With respect to gender, 183 individuals identify as Female and 227 as Male, totaling 410 respondents. The near-balanced distribution between Female and Male suggests relatively equitable representation within the sample. However, it is important to note that gender identity is a complex and fluid dimension, encompassing a variety of identities beyond binary categories. Therefore, when interpreting these data, it is essential to consider sensitivity and the diversity of gender identities to ensure a complete and inclusive representation.

Regarding age distribution, most respondents, 176 individuals, fall within the range of 23 to 27 years, followed by the same number in the 28 to 33-year range. There is a notable presence of younger participants, with only seven individuals aged up to 22 years. Additionally, 34 respondents fall within the 34 to 40-year range, while 16 individuals are over 40 years old. Only one respondent chose not to disclose their age.

This distribution reflects a diverse sample in terms of age, with a considerable concentration of participants between 23 and 33 years old. Respondents were also asked to provide information regarding their monthly income, intentions to pursue further studies, employment status, the impact of their degree on their current socioeconomic situation, and the quality of the knowledge acquired during their course in relation to their professional practice.

Regarding monthly income, the data reveal a varied and representative distribution. Most graduates, 158 in total, report a monthly income of up to two minimum wages, indicating a sizeable proportion facing financial challenges. Conversely, a substantial number of graduates, 104, fall within the income range of two to four minimum wages, suggesting an emerging middle-income group.

Additionally, 85 and 36 graduates report monthly incomes of four to ten minimum wages and ten to twenty minimum wages, respectively, indicating a significant portion enjoying a relatively more comfortable financial situation. Finally, 16 graduates earn more than twenty minimum wages, representing a smaller yet notable group with substantially high income. With only eleven responses indicating “Not applicable,” the data reflect a broad range of economic realities among the graduates, highlighting both existing inequalities and potential opportunities for financial advancement (Table 2).

Table 2
Graduates income

Income	Quantity
Up to 2 minimum wages	158
From 2 to 4 minimum wages	104
From 4 to 10 minimum wages	85
From 10 to 20 minimum wages	36
Above 20 minimum wages	16
Not applicable	11
TOTAL	410

Source: Research data.

After completing their undergraduate studies, graduates followed a variety of educational and professional pathways. A portion of the alumni chose to pursue advanced studies, with 43 individuals currently enrolled in or having completed a doctoral program and 87 pursuing master’s degrees. In addition, 142 graduates opted to undertake specialization programs. Conversely, a considerable group of 100 graduates chose not to continue their studies

immediately after graduation, and 38 individuals expressed the intention to pursue further education in the future. These data reflect the diversity of paths taken by university graduates, indicating both an interest in continuing their studies and a preference among some to enter the labor market directly upon completing their undergraduate degree.

The data regarding the professional situation of graduates in relation to their field of study reveal a variety of outcomes. In this case, 260 graduates are employed in positions aligned with their academic training, indicating a match between their educational qualifications and professional occupations. According to Alves (2023), a significant proportion of graduates are employed in sectors related to their academic background, suggesting that higher education has a direct impact on employability and on the alignment between professionals and their respective areas of expertise.

However, 70 graduates are employed outside their fields of academic training, which may suggest a lack of opportunities within their specific disciplines or a deliberate decision to pursue new professional paths. Furthermore, 80 graduates are not currently employed, which may be attributed to different factors, such as labor market challenges, career changes, or personal preferences. This analysis highlights the complex dynamics between educational backgrounds and the professional trajectories of graduates, reflecting the different ways in which individuals apply their skills and knowledge in the labor market.

The data regarding the impact of academic training on graduates' current socioeconomic conditions reveal varied assessments: 146 graduates classified the effects of their training as "Very Good," suggesting that their educational experiences had a significantly positive impact on their socioeconomic trajectories. Additionally, 104 graduates evaluated the effects as "Good," indicating a favorable perception of the benefits generated by their academic training. Meanwhile, a smaller proportion of graduates, 90 in total, considered the impacts to be "Excellent," demonstrating an even more positive perception of the outcomes of their training.

The study by Fragoso et al. (2019) showed that higher education institutions (HEIs) are generally viewed as responsible for the employability of their graduates. The quality of teaching and the relevance of the curriculum to the labor market are crucial factors that contribute to the professional development of graduates. Thus, academic experience provides not only technical knowledge but also practical skills and networking opportunities that are fundamental for career advancement (Sin & Amaral, 2017).

On the other hand, 42 graduates rated the impacts of their training as "Fair," suggesting a neutral or ambiguous view regarding the effects of their education on their socioeconomic conditions. Moreover, 28 graduates expressed indifference toward the impact of their academic training. This analysis reveals a diversity of perspectives among graduates about the effects of their education on their socioeconomic situations, reflecting the complexity of individual experiences and professional trajectories following the completion of formal education.

Regarding perceptions of how academic training contributes to labor market entry, 133 graduates considered this contribution to be "Very Good," reflecting a positive assessment of the effectiveness of their training in facilitating their transition into the labor market. In addition, 108 graduates classified the contribution as "Excellent," indicating an even more positive perception of the fundamental role played by academic training in securing employment.

However, 57 graduates rated this contribution as "Fair," suggesting a more neutral or critical view of the effectiveness of their academic training in supporting labor market entry. Furthermore, 94 graduates evaluated the contribution as "Good," while 18 expressed indifference toward the role of their academic training in this regard. This analysis highlights

the complexity of graduates' experiences as they transition into the labor market and their varied perceptions of how their academic training influenced this process.

With respect to perceptions of the quality of knowledge acquired during the undergraduate program and its impact on graduates' professional practice, 189 graduates considered the knowledge gained as "Good," suggesting a positive perception regarding the usefulness and relevance of the course content for their professional activities. Moreover, 130 graduates evaluated the knowledge acquired as "Very Good," indicating an even more positive perception of its quality and applicability in their careers. In contrast, a smaller number of graduates—68 in total—rated the knowledge as "Average," suggesting a more neutral or ambiguous view of the effectiveness of the course content in their professional practice.

The technical and theoretical knowledge acquired during undergraduate education is essential for employability and career progression (Carvalho et al., 2023). Skills such as critical thinking, problem-solving, and field-specific competencies, developed at the university, are highly valued in the labor market and contribute significantly to professional success (Shoeninger & Riva, 2015). Higher education not only enhances employment opportunities but also enables individuals to perform more complex tasks and stand out in their fields.

Additionally, a small portion of graduates considered the knowledge acquired as "Little" (13) or "Very Little" (10), possibly indicating perceived gaps in how well the program prepared them for professional activities. This analysis reinforces the importance of teaching quality and the relevance of course content for graduates' professional development, as well as the need for continuous evaluation and improvement of educational programs.

4.2 Compensation, Demographic Characteristics, and Graduates' Evaluations

Regarding the results obtained from Equation 1, after assessing the model's quality and analyzing the statistical significance of the regression coefficients, a summary of the results is presented in Table 3. The coefficient of determination (R^2) was 0.3714, indicating the proportion of the variance in the dependent variable explained by the independent variables. With respect to the coefficients, it is observed that most of the independent variables are statistically significant.

Table 3

Estimation using multiple regression

Variables	Coefficient	Standard deviations	t-value	p-value
intercept	0.12654	0.30218	0.419	0.67561
gender	0.24812**	0.09502	2.611	0.00936
age	0.21393***	0.05958	3.591	0.00037
edu	-0.11393*	0.04857	-2.346	0.01947
prof	1.01731***	0.11624	8.752	0.00000
avac	-0.10060	0.06642	-1.515	0.13061
avai	0.39534***	0.05754	6.871	0.0000
avaq	-0.14395*	0.06813	-2.113	0.03522
F Test	35.52***	Breush_Godfrey	3.8794**	
R ²	0.3714	Breush-Pagan	44.321***	
Jarque-Bera	8.5736***			

Significance values: *0.05; **0.01; ***0.001

Source: Research data.

Regarding the gender variable, the coefficient was positive, indicating that men have higher incomes than women. The relationship between income and male gender among university graduates may reveal significant disparities. In many contexts, male graduates tend to earn higher incomes compared to their female counterparts, even when they possess similar levels of education.

This disparity may be attributed to several factors, including gender discrimination in the labor market, differences in chosen fields of study, unequal career opportunities, and issues related to work–life balance (Silveira et al., 2020). Understanding these disparities is essential for identifying and addressing gender inequalities in access to the labor market and in the professional development of university graduates.

Based on the result for the variable age, it can be concluded that individuals in higher age groups tend to have higher incomes. In many contexts, age can significantly influence professional trajectories and earnings after completing higher education. Younger graduates often face lower initial salaries but may experience rapid career progression, while older graduates tend to earn higher wages due to accumulated experience and career advancement over time (Silveira et al., 2020).

With respect to the edu variable, the coefficient was negative, indicating that graduates with higher levels of postgraduate education earn lower incomes. One possible explanation for this result is that income is not determined solely by postgraduate qualifications, but also by other factors such as professional experience, specific skills, labor market demand, and geographic location. Additionally, graduates who decide to pursue postgraduate studies often receive only a scholarship and may enter the labor market only after completing their specialization (Dos Santos & Jezine, 2020).

The prof variable had a positive coefficient, indicating that, on average, graduates working outside their original field of study tend to report higher income levels compared to those who remain strictly within their area of undergraduate specialization. In this case, the labor market values not only technical expertise but also transferable skills, such as communication, problem-solving, and leadership, which may be acquired in different professional contexts. Furthermore, this phenomenon may be influenced by regional sectoral dynamics, in which certain industries or services with higher earning potential demand generalist or multifaceted professional profiles rather than narrowly defined technical specialization.

Regarding the avai variable (assessment of the course's impact on socioeconomic conditions), the results indicate that the greater the perceived impact, the higher the graduates' income. Generally, university education is considered one of the main determinants of an individual's lifetime earnings. University graduates tend to have better employment opportunities and access to higher-paying positions compared to those with lower educational levels (Dos Santos & Jezine, 2020).

The avaq variable (assessment of the quality of knowledge acquired) presented a negative coefficient, implying that the higher the perceived quality of the knowledge acquired, the lower the income reported by graduates. While income often reflects an individual's financial success, the assessment of knowledge quality may be more closely related to the capacity to apply this knowledge meaningfully and effectively in the labor market or professional life.

Graduates with lower incomes may have acquired valuable academic knowledge but still face structural or contextual barriers that limit their ability to convert this knowledge into well-paid employment opportunities (Gomes, 2023). This disparity highlights a mismatch

between the higher education provided and the actual opportunities offered by the regional productive structure, reinforcing the need for public and institutional policies that can better align academic training with labor market demands.

4.3 Probability of Working in the Field of Study, Demographic Characteristics, and Graduates' Evaluations

This section presents the results from the estimation of Equation 2, which investigates the impact of demographic characteristics and course evaluations on the probability that graduates are working in their field of study (Table 4). The table reports the results of the logistic regression, providing information on the coefficients of the independent variables, their odds ratios, standard errors, z-values, and associated p-values.

The overall goodness-of-fit of the model was assessed using the likelihood ratio test (F-test), which compares the deviance of the fitted model with that of the null model. The test statistic was 208.7085 with a very small p-value ($p < 0.0000$). This p-value indicates rejection of the null hypothesis that the null model is sufficient. Therefore, we conclude that the fitted model, which includes the independent variables, is statistically significant.

Table 4

Logit Estimation

Variables	coefficient	odds ratios	Standard deviations	z-value	p-value
Intercept	-2.6489***	0.0707	0.8404	-3.152	0.0016
gender	-0.1241	0.8832	0.2784	-0.446	0.6556
age	-0.4599***	0.6313	0.1733	-2.653	0.0079
income	1.3284***	3.775	0.1853	7.167	0
edu	0.0846	1.0883	0.138	0.613	0.5698
avac	1.0563***	2.8758	0.1884	5.607	0
avai	0.1908	1.2102	0.1706	1.118	0.2635
avaq	-0.4659**	0.6275	0.206	-2.262	0.0237
F Test	208.7085***	McFadden	0.3875	Accuracy	0.822
Wald test	107.6***	ROC	51.41%	Sensitivity	0.881
				Specificity	0.72

Significance values: *0.05; **0.01; ***0.001

Source: Research data.

Additionally, based on the Wald test, it is observed that, collectively, at least one of the independent variables has a significant effect on the dependent variable. McFadden's statistic, often referred to as pseudo- R^2 , provides an indication of how much variation in the dependent variable is explained by the model relative to the null model. In this case, a value of 0.3875 was obtained, indicating that the model explains approximately 38.75% of the variation that would be explained by the null model.

The ROC curve (Receiver Operating Characteristic), which assesses the performance of the classification model, had a value of approximately 52%, suggesting a moderate ability of the model to discriminate between classes, performing better than a random model. As for accuracy, the value was 0.822, indicating that the model correctly classified roughly 82.2% of the observations. With respect to sensitivity, the model achieved 0.881, meaning that it captured 88.1% of true positive cases. Finally, specificity indicated that about 72% of true negative cases were correctly identified.

Regarding the control variables, it is observed that gender (male) did not present statistical significance. This suggests that, for the sample under study, gender may not influence the probability of graduates finding employment in their field of study. These results indicate the possibility that, in the labor market of Juazeiro do Norte (CE), no strong distinction is made between men and women.

With respect to age, a negative and significant coefficient was found. This result suggests that a one-unit increase in the variable is associated with a decrease of approximately 36.87% $[(0.6313 - 1) \times 100]$ in the odds of a graduate finding employment in their field, holding the other variables constant. These findings indicate that, as individuals age, opportunities for employment in their field of study may diminish. One possible explanation is that employers may prefer younger professionals, who generally receive lower salaries compared to more experienced workers.

Regarding income, a positive and statistically significant coefficient was observed. In other words, a one-unit increase in income is associated with an increase of approximately 277.50% in the odds of graduates working in their field. This finding suggests that individuals who secure employment within their field of study tend to enjoy higher earnings. This positive correlation between income and employability underscores the economic and professional importance of field-specific education.

Concerning the evaluation of the course's contribution to labor market insertion (avac), it is observed that a one-unit increase in this evaluation is associated with a significant increase of about 187.58% in the odds of working in the field of study. As highlighted by Tilak et al. (2021), the competencies and skills developed during higher education are as important as the diploma itself. Students in business administration programs have ranked communication, learning abilities, positive attitudes and behaviors, and problem-solving skills as the four most important employability competencies sought by employers (Mainga et al., 2022).

Nilsson (2017) argues that in all OECD countries, employment probabilities are higher for individuals with higher education degrees compared to those with upper secondary or post-secondary non-tertiary education, who in turn have better employment prospects than those with lower levels of education. These findings are supported by Lemos et al. (2011), who assert that higher education provides greater opportunities regardless of social background.

With regard to the evaluation of the course's impact on socioeconomic conditions (avai), the variable did not reach statistical significance. This lack of significance may be attributed to several factors requiring more detailed investigation, such as the subjective nature of individual perceptions of the course's impact or influences from variables not included in the model. On the other hand, in all OECD countries, higher education levels are associated with higher earnings (Nilsson, 2017).

Finally, the evaluation of the quality of the knowledge acquired (avaq) shows a negative and significant coefficient. A one-unit increase in this evaluation is associated with an approximate 37.25% decrease in the odds of graduates working in their field. These results may be interpreted in light of two possible explanations. First, students may have a distorted perception of the course's quality relative to actual labor market demands. Second, the limitations of the local labor market in Juazeiro do Norte may hinder the absorption of well-trained professionals, even when they possess solid academic preparation. These interpretations highlight the complexity of the relationship between graduates' perceptions of course quality and the realities of the local labor market.

Nilsson (2017) and Tilak et al. (2021) argue that higher education graduates often face difficulties securing employment in their field because academic training may diverge

substantially from everyday practices. Higher education follows a school-based logic focused on processes and the association of theoretical knowledge, whereas the labor market follows a production-based logic oriented toward results, where applied knowledge is valued (Nilsson, 2017). Thus, even when graduates believe their training was of good quality, it may still be misaligned with the realities of the regional labor market.

In the study by Ferreira and Abranches (2018), 47% of students reported that their training is only partially compatible with labor market needs, especially in the current context marked by waves of innovation affecting the business sector. In sum, this analysis provides valuable insights into the determinants of graduate employability in Juazeiro do Norte (CE). The results highlight both areas of success and opportunities for improvement, offering a solid foundation for future discussions and potential educational and labor market interventions.

5 Final Considerations

This study set out to examine how demographic characteristics and perceptions about academic training influence the professional outcomes of graduates from the Federal University of Cariri (UFCA). By focusing on income levels and the probability of working in one's field of study, the research offers insights that may support discussions on educational policies, employability, and career development.

Understanding how income relates to demographic factors and evaluations of the academic experience is essential for guiding initiatives that aim to improve professional growth and promote equal opportunities. The findings suggest that graduates who diversify their skills and move across different occupational fields tend to achieve higher earnings, which highlights the importance of transferable competencies in the local labor market.

Some of the results challenge common expectations. Graduates who pursued higher levels of postgraduate education reported lower income on average, indicating that additional academic credentials do not necessarily translate into higher wages. Moreover, those who work outside their original field tend to earn more, which may reflect a labor market that rewards broader professional flexibility rather than specialized academic training. The study also shows that perceiving the course as having a practical impact on one's career is positively associated with income, reinforcing the value of academic experiences that connect effectively with professional practice.

With regard to working in the field of study, the analysis indicates that age reduces the likelihood of being employed in the original area of training, suggesting that the market favors younger professionals for certain positions. Income, in contrast, is positively associated with remaining in the field, which may reflect a two-way relationship between economic stability and career relevance. Although the perceived contribution of the course to professional insertion proved meaningful, the evaluation of its impact on socioeconomic conditions showed no statistical significance, pointing to the need for further exploration of this complex relationship.

This research contributes to a better understanding of the labor market in Juazeiro do Norte and offers evidence that may help shape institutional strategies for academic training and graduate placement. It also reinforces the importance of inclusive policies, particularly given the disadvantages faced by older professionals. Nevertheless, the study has limitations. The analysis is based on data from a specific region, which restricts the generalizability of the findings, and the absence of qualitative information limits the depth of interpretation regarding graduates' perceptions and the nuances of the local labor market.

Future research could examine the socioeconomic effects of academic programs through qualitative methods or longitudinal studies that track changes over time. Expanding the analysis to other municipalities and institutions could also strengthen the comparative dimension of this type of investigation. Additionally, exploring initiatives that support the employability of more experienced professionals may generate valuable insights. Overall, this study sheds light on the factors that shape employability and earnings among UFCA graduates, while also identifying promising areas for future inquiry.

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